The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for forming a dual damascene feature, comprising:

forming vias in an etch layer;

providing a trench patterned mask over the etch layer;

etching a trench into the etch layer, wherein the etching the trench comprises a cycle of:

forming protective sidewalls over the sidewalls of the vias, which prevent faceting and fence formation; and

etching a trench through the trench patterned mask; and

stripping the mask; and

repeating the trench cycle at least three times.

2. (Canceled)

3. (Original) The method as recited in claim 1, wherein the trench etch cycle is repeated at least five times.

4. (Original) The method, as recited in claim 3, wherein the passivation and etching are performed in a common plasma processing chamber.

5. (Original) The method, as recited in claim 4, wherein the deposition uses a non-directional deposition and the etching step uses a directional etching.

6. (Original) The method, as recited in claim 5, wherein the wafer is bombarded by energetic ions with ionic energy greater than 100 ev during the deposition step.

7. (Original) The method, as recited in claim 5, wherein the passivation is a non-etching or a

negligibly etching deposition.

8. (Original) The method, as recited in claim 5, wherein the deposition uses a gas mixture containing at least one of H2, CH3F, CH2F2, CHF3, C4F6, C4F8 as the polymer former and at least one of CF4, C2F6, and NF3 as the etching gas.

9. (Original) The method, as recited in claim 5, wherein the deposition step uses a mixture containing CF4 and H2.

10. (Original) The method as recited in claim 9, wherein the CF4 to H2 gas flow ratio is in the range of 0.6:1 to 1.4:1 by volume flow rate.

11. (Original) The method, as recited in claim 7, wherein the deposition process is selected from at least one of chemical vapor deposition and sputtering.

12. (Original) The method, as recited in claim 1, wherein the etch layer is a low-k dielectric material.

13. (Currently Amended) The method, as recited in claim_1, wherein the via holes are not filled with a sacrificial filler material prior to the start of the trench plasma etching process.

14. (Original) The method, as recited in claim 1, wherein the via holes are filled with a filler material to no more than 50% of the via hole height prior to the start of the trench plasma etching process.

15-16 (Canceled)

17. (Withdrawn) An apparatus for etching a layer under an etch mask, wherein the layer is

supported by a substrate, comprising:

a plasma processing chamber, comprising:

a chamber wall forming a plasma processing chamber enclosure;

a substrate support for supporting a substrate within the plasma processing chamber enclosure;

a pressure regulator for regulating the pressure in the plasma processing chamber enclosure;

at least one electrode for providing power to the plasma processing chamber enclosure for sustaining a plasma;

a gas inlet for providing gas into the plasma processing chamber enclosure; and

a gas outlet for exhausting gas from the plasma processing chamber enclosure;

a deposition gas source;

an etchant gas source;

a first control valve in fluid connection between the gas inlet of the plasma processing chamber and the deposition gas source;

a second control valve in fluid connection between the gas inlet of the plasma processing chamber and the etchant gas source;

a controller controllably connected to the first control valve, the second control valve, and the at least one electrode, comprising:

at least one processor; and

computer readable media, comprising:

computer readable code for opening the first control valve for at least one deposition step to provide a deposition gas from the deposition gas source to the plasma processing chamber enclosure;

computer readable code for closing the second control valve for the at least one deposition step to prevent etching gas from the etchant gas source from entering the plasma processing chamber enclosure; and

computer readable code for opening the second control valve for at least one etching step to provide an etching gas from the etchant gas source to the plasma processing

chamber.

18. (Withdrawn) The apparatus, as recited in claim 15, wherein the computer readable media further comprises computer readable code for performing the at least one deposition step and at least one etching step in an alternating fashion for a plurality of times.

19. (Withdrawn) The apparatus, as recited in claim 16, wherein the etchant gas source comprises an etching gas component source and a polymer former gas component.

20. (Previously Presented) The method, as recited in claim 8, wherein the etching uses an etching gas mixture with components and wherein the forming the protective sidewalls uses a deposition gas mixture with components, wherein at least some of the components of the deposition gas mixture are not mixed with at least some of the components of the etching gas mixture.

21. (Previously Presented) The method, as recited in claim 5, wherein the etch layer is a low-k dielectric layer without a trench stop layer.

22. (Previously Presented) The method, as recited in claim 1, wherein the etch layer is a low-k dielectric layer without a trench stop layer.